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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,255	09/24/2003	Thomas J. Hunt	21256	3290

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EXAMINER	
STONER, KILEY SHAWN	
ART UNIT	**PAPER NUMBER**
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/668,255	HUNT ET AL.	
	Examiner	Art Unit	
	KILEY STONER	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 12 and 19 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Independent claims 1 and 18 require forming the sputter target from a ferromagnetic material; however, claims 12 and 19 contradict the independent claims by not listing materials that are not ferromagnetic. Correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ogata et al. (JP-402043362A) (hereafter Ogata) in view of Shindo et al. (US 2001/0032686A1).

Ogata teaches a disc shaped sputter target/backing plate assembly made by forming a plurality of segmented and spaced-apart ridges (3) within the surface of the periphery of the bonding surface of the backing plate (1) (Abstract; and Figures 2(1) and 2(2)). The ridges of Ogata inherently act as spacers/standoffs for the supply of soldering material between said backing plate and a sputter target. Ogata also teaches forming a sputter target with a substantially flat sputtering surface (2) and bonding surface, applying solder material (4) to the interface spaces and allowing the solder to solidify to form a bond (abstract and figure 1). Ridges are circular, arcuate (identified as semicircular in the abstract) or polygonal (figures 3-1 to 3-4) with heights and widths of about 0.02 to about 0.06 inches with a distance between ridges (pitch) of up to about 0.4 inches (abstract). Columns 7-8 of Ogata teach known soldering alloys.

Ogata does not teach that the sputter target is a ferromagnetic material; however, Shindo teaches soldering a ferromagnetic sputtering target to a backing plate (paragraphs 1 and 63-64; and table 1). Shindo also teaches the sputtering target is selected from the group comprising titanium, aluminum, copper, molybdenum, cobalt, chromium, ruthenium, rhodium, palladium, silver, iridium, platinum, gold, tungsten, silicon, tantalum, vanadium, nickel, iron, manganese, germanium, and alloys thereof (paragraphs 1 and 63-64; and table 1); the backing plate is selected from the group consisting of copper, aluminum, titanium, and alloys thereof (paragraph 64); and the solder is liquid or paste selected from the group comprising tin-lead, indium-tin, tin-silver, tin-copper, or tin-silver-copper (paragraph 64). The solder is liquid during the bonding process.

At the time of the invention it would have been obvious to one of ordinary skill in the art to substitute the ferromagnetic sputter target material, the backing plate material and solder material as taught by Shindo for the materials of Ogata in order to form a sputter target/backing plate assembly which exhibits good magnetic properties and produces fewer particle during the sputtering process. Thus, the claim would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

Claims 1, 3-5 and 12-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukumoto et al. (JP-411200028A) (hereafter Fukumoto) in view of Shindo.

With respect to claim 1, Fukumoto teaches a method for forming a solder bonded sputter target/backing plate assembly comprising the steps of: a) forming a backing plate (#2,#3) with a bonding surface having a plurality of segmented and spaced-apart ridges (figure 2, #3) that are disposed on and within the periphery of the bonding surface of the backing plate, which perform as spacers/standoffs for the supply of solder material between said backing plate and a sputter target (#1); b) forming said sputter target having a sputtering surface and substantially flat bonding surface (figure 3); c) applying said solder material (#6) to the interface spaces defined by superimposing said sputter target within the periphery of and onto the plurality of ridges on the backing plate; and d) allowing said solder material to solidify and bond the sputter target to the backing plate so that the plurality of ridges provide an effective uniform thickness solder

bonded interface (figure 3). In addition, Fukumoto states that since a tape spacer is being beforehand fixed to the back up plate in a manufacturing method of this invention, when joining a target material, there is no possibility that a position of a tape shape spacer may shift, and workability is good (paragraph 17).

Fukumoto does not teach that the sputter target is a ferromagnetic material; however, Shindo teaches soldering a ferromagnetic sputtering target to a backing plate (paragraphs 1 and 63-64; and table 1).

At the time of the invention it would have been obvious to one of ordinary skill in the art to substitute the ferromagnetic sputtering target as taught by Shindo for the material used in the sputtering target of Fukumoto in order to form a sputter target/backing plate assembly which exhibits good magnetic properties and produces fewer particle during the sputtering process. Thus, the claim would have been obvious because the substitution of one known element for another would have yielded predictable results to one of ordinary skill in the art at the time of the invention.

With respect to claim 3, Fukumoto teaches wherein the ridges on the bonding surface of the backing plate have a shape selected from the group comprising a circle, arcuate, square, rectangular, polygon and combination thereof (figures 2, 4 and 5).

With respect to claim 4, Fukumoto teaches wherein the height of the ridges is between about 0.005 inch and about 0.050 inch (paragraph 11).

With respect to claim 5, Fukumoto teaches a preferred width of 5-30 mm is preferred, but does not explicitly teach that the width of the ridges is between about

0.005 inch and about 0.050 inch. However, it is the examiner's position that it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the width of the ridges between about 0.005 inch and about 0.050 inch, since it has been held that discovering an optimum value or a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). The artisan would have been motivated to set the width of the ridges between about 0.005 inch and about 0.050 inch by the reasoned expectation of forming a satisfactory bond. Where the general conditions of the claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. (*In re Aller*, 220 F.2d 454, 456 (CCPA 1955)).

With respect to claims 12, 15 and 19, Fukumoto is silent with respect to the material of the sputtering target; however, Shindo teaches that the sputtering target is selected from the group comprising titanium, aluminum, copper, molybdenum, cobalt, chromium, ruthenium, rhodium, palladium, silver, iridium, platinum, gold, tungsten, silicon, tantalum, vanadium, nickel, iron, manganese, germanium, and alloys thereof (paragraphs 1 and 63-64; and table 1).

With respect to claim 13, Fukumoto teaches wherein the backing plate is selected from the group comprising copper, aluminum, titanium, and alloys thereof (paragraphs 2 and 9). Shindo also teaches soldering a ferromagnetic sputter target to a copper backing plate with an In-Sn solder (paragraph 64).

With respect to claim 14, Fukumoto teaches wherein the solder is liquid or paste and selected from the group comprising tin-lead, indium-tin, tin-silver, tin-

copper, or tin-silver-copper (paragraph 2). Shindo also teaches soldering a ferromagnetic sputter target to a copper backing plate with a In-Sn solder (paragraph 64).

With respect to claim 16, Fukumoto is silent with respect to the material of the sputtering target; however, at the time of the invention one of ordinary skill in the art would have recognized that cobalt, nickel, and alloys thereof could are been successfully bonded to a copper sputtering target. In addition, the examiner takes Official Notice that it is well known in the art to utilize sputter targets selected from the group comprising cobalt, nickel, and alloys thereof (note the teachings of Ivanov).

With respect to claim 17, Fukumoto teaches wherein the height of the ridges is between about 0.010 inch and about 0.030 inch and the thickness of the width of the ridges is between about 0.010 inch and about 0.030 inch (paragraph 17).

With respect to claim 18, Fukumoto teaches a solder bonded sputter target/backing plate assembly comprising a backing plate (#2,#3) having a plurality of segmented spaced-apart ridges (figure 2, #3) disposed on and within the periphery of the bonding surface of said backing plate, which perform as spacers/standoffs upon supplying a solder material between said backing plate and a sputter target (#1); said sputter target having a substantially flat sputter surface and a bond surface; said sputter target superimposed onto the plurality of ridges on the bonding surface of the backing plate (figure 3); and a solder bonded layer (#6) disposed between the sputter target and backing plate and between the ridges producing an effective uniform thickness solder bonded interface for the sputter target/backing plate (figure 3).

With respect to claim 20, Fukumoto teaches wherein the bonded solder is selected from the group comprising tin-lead, indium-tin, tin-silver, tin-copper, or tin-silver-copper (paragraph 2). Shindo also teaches soldering a ferromagnetic sputter target to a copper backing plate with an In-Sn solder (paragraph 64).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukumoto and Shindo as applied to claim 1 above, and further in view of Hunt et al. (US 6,073,830) (hereafter Hunt).

With respect to claim 2, Fukumoto and Shindo fail to teach that the backing plate and sputter target are disc-shaped; however, Hunt teaches that the backing plate and sputter target are disc-shaped (figures; and column 9, lines 4-8).

At the time of the invention it would have been obvious to utilize the spacers of Fukumoto and the materials of Shindo with the disc-shaped sputter target/backing plate assembly in order to prevent warping of the assembly during bonding.

Response to Arguments

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

The applicant argues that the presently claimed invention recites the spaced apart ridges to be segmented to accommodate the solder supplied between the backing plate and the sputter target which is made of ferromagnetic materials. Thus, the

sputtering target and the backing plate have similar coefficients of thermal expansion, and the ridges act as spacers to ensure a substantially uniform solder thickness.

It should be noted that the claims do not require the sputtering target and the backing plate to have similar coefficients of thermal expansion. Moreover, the claims do not require the ridges to act as spacers (standoffs). In other words, the claims do not require the sputtering target to rest/sit on the ridges of the backing plate. Thus, the applicant's arguments are not commensurate in scope with the claims.

The ridges of Ogata promote a uniform surface tension across the interface between the sputter target and backing plate. Accordingly, the ridges of Ogata provide an effective uniform thickness solder bonded interface. In addition, the minimization of warping also promotes an effective uniform thickness solder bonded interface

With respect to Fukumoto the applicant argues that the present invention calls for a plurality of spaced-apart ridges machined on the bonding surface of the backing plate. This argument is also not commensurate in scope with the claims

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kiley Stoner whose telephone number is 571-272-1183. The examiner can normally be reached Monday-Thursday (9:30 a.m. to 8:00 p.m.).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kiley Stoner/
Primary Examiner, Art Unit 1793